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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,339	05/11/2001	Konstantin Mirochnik	45074.32	4708

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EXAMINER

FETZNER, TIFFANY A

ART UNIT PAPER NUMBER

2859

DATE MAILED: 04/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
10/852,339

Applicant(s)
Mirotnich et al.,

Examiner
Tiffany Fetzner

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2859



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on May 11, 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on May 11, 2001 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☒ None of:

- ☒ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____.
- ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ | 6) <input type="checkbox"/> Other: |

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DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Canada on March 26th 2001. It is noted, however, that applicant has not filed a certified copy of the CA 2,324, 007 application as required by 35 U.S.C. 119(b). Therefore the effective priority date for the instant application is applicant's filing date of May 11th 2001.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in

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section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1-11**, are rejected under **35 U.S.C. 102(e)** as being anticipated by **Flaum et al.**, US patent 6,140,817.

5. With respect to **Claim 1**, **Flaum et al.**, teaches “A method of determining the oil content” (i.e. the hydrocarbon content) “of a fluid emulsion” (i.e. a mixture of heterogeneous or dissimilar fluids) “comprising heavy oil and water”, [See abstract] “comprising the steps of: (a) providing a low field NMR relaxometer;” (i.e. a nuclear magnetic resonance device capable of measuring at least one relaxation distribution, t_1 , t_2 , T_2^*) [See abstract, Figure 1] “(b) measuring and recording the $T_{2\rho}$ relaxation spectrum of the emulsion” (i.e. the combinational mixture of heterogeneous or dissimilar fluids: light and heavy formation oil, water, oil base mud, hexane) “at a temperature” [See col. 15 line 66 through col. 16 line 10 where measurements at reservoir temperature are taught.] Additionally, **Flaum et al.**, teaches “allowing recovery of the T_2 spectrum of the heavy oil;” [See col. 8 line 65 though col. 9 line 5 where the relationships of porosity and bound fluid volume, where bound fluid volume includes bound water, oil, or a combination of oil and water that does not move, requires the measurement of the full NMR T_2 distribution, and col. 8 lines 20-47] “(c) determining a $T_{2\rho}$ cutoff value;” [See col. 5 lines 20-54] “(d) measuring the total amplitude of the spectrum at $T_{2\rho}$ times less than and equal to the $T_{2\rho}$ cutoff value ($A_{sub.oil}$); [See col. 4 lines 12-14; col. 8 lines 20-47] “and (e) converting $A_{sub.oil}$ ” (i.e. the signal strength or amplitude of the oil components) “to a weight

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value by dividing A.sub.oil" (i.e. the signal strength or amplitude of the oil components) "by the amplitude index of an oil standard of known weight (AI.sub.oil)." [See equation 6, and equation one in combination, col. 4 line 51 through col. 5 line 59]

6. With respect to **Claim 2, Flaum et al.**, shows and suggests from figure 6 that "the T.sub.2 cutoff value is about 10 milliseconds". [See Figure 6] **Flaum et al.**, lacks directly teaching that the "temperature" (i.e. of the reservoir) "is about 30 degrees Celsius" However, **Flaum et al.**, suggests, from figure 6, that the water and oil peaks occur in the same milliseconds through seconds time range, that effectively corresponds to a temperature of about 30 degrees Celsius. [See figure 6, col. 8 lines 30-37] Additionally, **Flaum et al.**, teaches the temperature of the reservoir is determined by the CMR depth of investigation using reservoir conditions. [See col. 15 line 67 through col. 16 line 10], therefore conducting the **Flaum et al.**, apparatus and method at 30 degrees Celsius falls within the scope of the **Flaum et al.**, reference.

7. With respect to **Claim 3, Flaum et al.**, teaches "A method of determining the water content" (i.e. bound fluid volume for water and hexane) "of a fluid emulsion" (i.e. a mixture of heterogeneous or dissimilar fluids) "comprising heavy oil and water", [See abstract, col. 8 lines 27-47] "comprising the steps of: (a) providing a low field NMR relaxometer;" (i.e. a nuclear magnetic resonance device capable of measuring at least one relaxation distribution, t1, t2, T2*) [See abstract, Figure 1] "(b) measuring and recording the T.sub.2 relaxation spectrum of the emulsion" (i.e. the combinational mixture of heterogeneous or dissimilar fluids: light and heavy formation oil, water, oil base mud, hexane) "(c) determining a T.sub.2 cutoff value;" [See col. 5 lines 20-54] "(d) measuring the total amplitude of the spectrum at T.sub.2 times greater than the

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T.sub.2 cutoff value (A.sub.w);” [See Figure 6 which shows t2 measurements for values greater than the cutoff values shown in Figure 6.] “ and (e) converting A.sub.w to a weight value by dividing A.sub.w by the amplitude index of a water standard of known weight (AI.sub.w). [Figure 6 col. 14 lines 49-61].

8. With respect to **Claim 4, Flaum et al.**, suggests “determining the total weight of the sample”, because **Flaum et al.**, conducts density measurements of mass/volume which are considered by the examiner to be a type of weight measurement. [See col. 8 line 20 through col. 11 line 57, abstract] “and determining the oil content of the emulsion by subtracting the water content of the sample from the total weight of the sample.” [See col. 8 line 20 through col. 11 line 57, abstract, Figure 8b]

9. With respect to **Claim 5, Flaum et al.**, teaches and shows “An apparatus for determining the oil content of a flowing fluid emulsion comprising heavy oil and water” [See abstract, Figure 1] “comprising: (a) a low field NMR relaxometer having a NMR magnet positioned in proximity to a channel through which the emulsion” (i.e. the combinational mixture of heterogeneous or dissimilar fluids: light and heavy formation oil, water, oil base mud, hexane) “flows, said relaxometer for measuring the T.sub.2 spectrum of a the sample;” [See col. 5 lines 20-34; col. 5 lines 39-54] “(b) means connected to the relaxometer for measuring total T.sub.2 amplitude below a T.sub.2 cutoff value, wherein a substantial portion of the spectrum attributable to the oil is at T.sub.2 values less than or equal to the T.sub.2 cutoff value;” (i.e. the means in the **Flaum et al.**, reference is the processor subsystem 7) [See Figure 1 col. 6 line 36 through col. 7 line 3; col. 4 lines 12-14; col. 8 lines 20-47] “and (c) means for converting the total T.sub.2 amplitude

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value to a weight value" (i.e. the means in the **Flaum et al.**, reference is the processor subsystem 7) [See Figure 1 col. 6 line 36 through col. 7 line 3].

10. With respect to **Claim 6, Flaum et al.**, shows "the T.sub.2 cutoff value is about 10 milliseconds." [See Figure 6]

11. With respect to **Claim 7, Flaum et al.**, teaches and suggests that "the relaxometer" (i.e. the NMR well-logging device which detects t2 and t1 components) "operates at less than about 2 MHZ.," because the operational frequency of the device is taught to be 1Mhz. [See col. 1 lines 15-33].

12. With respect to **Claim 8, Flaum et al.**, teaches and suggests that "the relaxometer" (i.e. the NMR well-logging device which detects t2 and t1 components) "operates at about 1 MHZ.," because the operational frequency of the device is taught to be 1Mhz. [See col. 1 lines 15-33]

13. With respect to **Claim 9, Flaum et al.**, discloses a method and apparatus as stated above in paragraph 5. **Flaum et al.**, lacks teaching that the apparatus comprises "a heater for heating the emulsion flow." However, because **Flaum et al.**, teaches that the temperature of the reservoir (i.e. which includes the emulsion mixture of heavy oil and water being tested within the well-bore) is determined by the CMR depth of investigation using the current reservoir conditions. [See col. 15 line 67 through col. 16 line 10], it would have been obvious to one of ordinary skill in the art, at the time that the invention was made that the earth's core and the earth's air-pressure in the borehole effectively function as a reservoir heater, when the depth of investigation is increased into the earth. Therefore although not stated by the **Flaum et al.**, it also would have been obvious to one of ordinary skill in the art, at the time that the invention was made that the **Flaum et al.**,

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reference, has a naturally occurring heater (i.e. the earth itself) which effectively heats the “emulsion flow” within the reservoir, (i.e. the combinational mixture of heterogeneous or dissimilar fluids: such as light and heavy formation oil, water, oil base mud, or hexane), because the **Flaum et al.**, reference investigates formations surrounding an earth bore hole. The same reasons for rejection, that apply to **claim 5** also apply to **claim 9**.

14. With respect to **Claim 10**, **Flaum et al.**, teaches and shows “An apparatus for determining the oil content of a fluid emulsion comprising heavy oil and water” [See abstract, Figure 1] “comprising: (a) means for obtaining a sample of the emulsion;” [See col. 8 lines 26-47; col. 11 line 60 through col. 16 line 60; Figure 1](b) a low field NMR relaxometer for measuring the T.sub.2 spectrum of the sample,” [See col. 5 lines 20-34; col. 5 lines 39-54; col. 8 lines 26-47] “(c) means connected to the NMR relaxometer for measuring total T.sub.2 amplitude below a T.sub.2 cutoff value, wherein a substantial portion of the spectrum attributable to the oil is at T.sub.2 values less than or equal to the T.sub.2 cutoff value;” (i.e. the means in the **Flaum et al.**, reference is the processor subsystem 7) [See Figure 1 col. 6 line 36 through col. 7 line 3; col. 4 lines 12-14; col. 8 lines 20-47] “and (d) means for converting the total T.sub.2 amplitude value to a weight value” (i.e. the means in the **Flaum et al.**, reference is the processor subsystem 7) [See Figure 1 col. 6 line 36 through col. 7 line 3]

15. With respect to **Claim 11**, **Flaum et al.**, teaches “A method of determining the oil content and water content of a fluid emulsion comprising heavy oil and water comprising the steps of: (a) providing a low field NMR relaxometer; (b) measuring and recording the T.sub.2 relaxation spectrum of the emulsion at a temperature allowing recovery of the T.sub.2 spectrum of the heavy

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oil; (c) determining a T.sub.2 cutoff value; (d) measuring the total amplitude of the spectrum at T.sub.2 times less than and equal to the T.sub.2 cutoff value (A.sub.oil); (e) converting A.sub.oil to a weight value by dividing A.sub.oil by the amplitude index of an oil standard of known weight (AI.sub.oil); (f) measuring the total amplitude of the spectrum at T.sub.2 times greater than the T.sub.2 cutoff value (A.sub.w); and (g) converting A.sub.w to a weight value by dividing A.sub.w by the amplitude index of a water standard of known weight (AI.sub.w)”, because this claim is just claims 1 and 3 combined, written in independent form. Therefore, the same reasons for rejection, that apply to **claims 1 and 3** also apply to **claim 11** and need not be reiterated.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tiffany Fetzner** whose telephone number is **(703) 305-0430**. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Diego Gutierrez**, can be reached on **(703) 308-3875**. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3432 .

18. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0956.



TAF

April 21, 2003



Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800